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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/620,074	07/14/2003	Pradip Patel	03-0580/LSI1P226	7110

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EXAMINER

WILLIAMS, ALEXANDER O

ART UNIT	PAPER NUMBER
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2826

DATE MAILED: 11/22/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/620,074

Applicant(s)

PATEL ET AL.

Examiner

Alexander O Williams

Art Unit

2826

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 1 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 September 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) 10-15 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-9 and 16-18 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____

Art Unit: 2826

Serial Number: 10/620074 Attorney's Docket #: 03-0580 (LSI1P226)
Filing Date: 7/14/2003;

Applicant: Patel et al.

Examiner: Alexander Williams

Applicant's Amendment filed 9/3/04 to the election with traverse of Group I (claims 1 to 9 and 16 to 18), filed 4/6/04, has been acknowledged.

This application contains claims 10-15 drawn to an invention non-elected with traverse. A complete response to the final rejection must include cancellation of non-elected claims or other appropriate action (see 37 CFR § 1.144 & MPEP § 821.01).

The reply filed on 9/3/04 is not fully responsive to the prior Office Action because of the following omission(s) or matter(s): Applicant's response arguments in reference to the Zhong et al. reference are not responsive to the outstanding rejection. Applicant's response to Huang et al. fail to consider that the I/O vias are with a conductive material that are conductive serving as pegs. Applicant's response arguments are in reference to figure 3A, however, the Examiner rejection is reference to figures 7A and 7F. See 37 CFR 1.111. Since the above-mentioned reply appears to be *bona fide*, applicant is given **ONE (1) MONTH or THIRTY (30) DAYS** from the mailing date of this notice, whichever is longer, within which to supply the omission or correction in order to avoid abandonment. **EXTENSIONS OF THIS TIME PERIOD MAY BE GRANTED UNDER 37 CFR 1.136(a).**

The following is a quotation of the appropriate paragraphs of 35 U.S.C. § 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

Art Unit: 2826

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1 to 6, 8 and 16 to 18 are rejected under 35 U.S.C. § 102(e) as being anticipated by Zhong et al. (U.S. Patent Application Publication # 2003/0179549 A1).

1. Zhong et al. (figures 2A to 15B) specifically figures 7A and 7F show a semiconductor integrated circuit (IC) package **700** comprising: a substrate **302** including at least one electrical ground plane **720** and having a plurality solder balls **306** formed on a surface thereof, said solder balls including a set of thermal solder balls positioned near the perimeter of the package; an integrated circuit die **304,704** mounted to the substrate such that the die is

Art Unit: 2826

electrically connected with some of the solder balls; and a heat spreader **706** mounted on the package such that the heat spreader is in thermal communication with the die and also in thermal communication with the set of thermal solder balls positioned near the perimeter of the package thereby enabling a portion of the heat generated by the die to be dissipated from the die through the heat spreader into the set of thermal solder balls.

2. The IC package of Claim 1, Zhong et al. show wherein the set of thermal solder balls **306** is electrically connected to said at least one electrical ground plane **720**; and wherein the heat spreader, at least one electrical ground plane, and the set of thermal solder balls are arranged so that heat generated by the die can be dissipated from the die through the heat spreader into the at least one electrical ground plane and into the set of thermal solder balls.

3. The IC package of Claim 2, Zhong et al. show wherein the heat spreader **706** electrically connected to the ground plane **720** operates to reduce electrical noise generated by the package.

4. The IC package of Claim 3, Zhong et al. show wherein the heat spreader **706** is connected to the thermal solder balls **306** using conductive mounting pegs **314** and wherein the heat spreader forms part of a electromagnetic shield that reduces the overall electrical noise generated by the package.

5. The IC package of Claim 3, Zhong et al. show wherein the heat spreader **706** is connected to the thermal solder balls **306** using conductive mounting pegs **314** and wherein the heat spreader, mounting pegs, and thermal solder balls form, in combination, part of a electromagnetic shield that reduces the overall electrical noise generated by the package.

16. Zhong et al. (figures 2A to 15B) specifically figures 7A and 7F show a semiconductor integrated circuit (IC) package **700** comprising:
a substrate **302** including at least one electrical ground plane **720** and having a plurality solder balls **306** formed on a surface thereof, said solder balls including a set of thermal solder balls electrically connected with a ground plane and positioned near the perimeter of the package, an integrated circuit die **304,704** mounted to the substrate such that the die is electrically connected with some of the solder balls; a heat spreader **706** mounted on the package with conductive mounting pegs **314** that are electrically connected with the ground plane and such that the heat spreader is in thermal communication with the die and in thermal communication with the set of thermal solder balls thereby enabling a

portion of the heat generated by the die to be dissipated from the die through the heat spreader into the set of thermal solder balls; and the combination of the electrically connected heat spreader, ground plane, and conductive mounting pegs operating together as a electromagnetic shield that reduces the amount of electrical noise of the package.

17. Zhong et al. show an electronic device incorporating the IC package of Claim

Claims 1 to 3, 6 and 8 are rejected under 35 U.S.C. § 102(e) as being anticipated by Huang et al. (U.S. Patent # 6,703,698 B2).

1. Huang et al. (figures 1A to 2E) specifically figure 2E show a semiconductor integrated circuit (IC) package comprising: a substrate **200** including at least one electrical ground plane **201b** and having a plurality solder balls **260** formed on a surface thereof, said solder balls including a set of thermal solder balls positioned near the perimeter of the package; an integrated circuit die **210** mounted to the substrate such that the die is electrically connected with some of the solder balls; and a heat spreader **230,220** mounted on the package such that the heat spreader is in thermal communication with the die and also in thermal communication with the set of thermal solder balls positioned near the perimeter of the package thereby enabling a portion of the heat generated by the die to be dissipated from the die through the heat spreader into the set of thermal solder balls.

2. The IC package of Claim 1, Huang et al. show wherein the set of thermal solder balls **201b,262** is electrically connected to said at least one electrical ground plane **201b**; and wherein the heat spreader, at least one electrical ground plane, and the set of thermal solder balls are arranged so that heat generated by the die can be dissipated from the die through the heat spreader into the at least one electrical ground plane and into the set of thermal solder balls.

3. The IC package of Claim 2, Huang et al. show wherein the heat spreader **232** electrically connected to the ground plane **201b** operates to reduce electrical noise generated by the package.

4. The IC package of Claim 3, Huang et al. show wherein the heat spreader **230** is connected to the thermal solder balls **260** using conductive mounting pegs **201c** and wherein the heat spreader forms part of a electromagnetic shield that reduces the overall electrical noise generated by the package.

Art Unit: 2826

5. The IC package of Claim 3, Huang et al. show wherein the heat spreader is connected to the thermal solder balls using conductive mounting pegs and wherein the heat spreader, mounting pegs, and thermal solder balls form, in combination, part of a electromagnetic shield that reduces the overall electrical noised generated by the package.

Initially, it is noted that the 35 U.S.C. § 103 rejection based on a ground plane and a conductive mounting pegs deals with an issue (i.e., the integration of multiple pieces into one piece or conversely, using multiple pieces in replacing a single piece) that has been previously decided by the courts.

In Howard v. Detroit Stove Works 150 U.S. 164 (1893), the Court held, "it involves no invention to cast in one piece an article which has formerly been cast in two pieces and put together...."

In In re Larson 144 USPQ 347 (CCPA 1965), the term "integral" did not define over a multi-piece structure secured as a single unit. More importantly, the court went further and stated, "we are inclined to agree with the solicitor that the use of a one-piece construction instead of the [multi-piece] structure disclosed in Tuttle et al. would be merely a matter of obvious engineering choice" (bracketed material added). The court cited In re Fridolph for support.

In re Fridolph 135 USPQ 319 (CCPA 1962) deals with submitted affidavits relating to this issue. The underlying issue in In re Fridolph was related to the end result of making a multi-piece structure into a one-piece structure. Generally, favorable patentable weight was accorded if the one-piece structure yielded results not expected from the modification of the two-piece structure into a single piece structure.

Therefore, it would have been obvious to one of ordinary skill in the art to use the ground planes and the

Art Unit: 2826

conductive mounting pegs as "merely a matter of obvious engineering choice" as set forth in the above case law.

Claims 4, 5 and 16 to 18 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Huang et al. (U.S. Patent # 6,703,698 B2).

4. The IC package of Claim 3, Huang et al. show wherein the heat spreader **230** is connected to the thermal solder balls **260** using conductive mounting pegs **201c** and wherein the heat spreader forms part of an electromagnetic shield that reduces the overall electrical noise generated by the package.

5. The IC package of Claim 3, Huang et al. show wherein the heat spreader is connected to the thermal solder balls using conductive mounting pegs and wherein the heat spreader, mounting pegs, and thermal solder balls form, in combination, part of an electromagnetic shield that reduces the overall electrical noise generated by the package.

16. Huang et al. (figures 1A to 2E) specifically figure 2E show a semiconductor integrated circuit (IC) package comprising:
a substrate **200** including at least one electrical ground plane **201b** and having a plurality of solder balls **260** formed on a surface thereof, said solder balls including a set of thermal solder balls electrically connected with a ground plane **201b** and positioned near the perimeter of the package,
an integrated circuit die **210** mounted to the substrate such that the die is electrically connected with some of the solder balls;
a heat spreader **230,220** mounted on the package with conductive mounting pegs **201b** that are electrically connected with the ground plane and such that the heat spreader is in thermal communication with the die and in thermal communication with the set of thermal solder balls thereby enabling a portion of the heat generated by the die to be dissipated from the die through the heat spreader into the set of thermal solder balls; and the combination of the electrically connected heat spreader, ground plane, and conductive mounting pegs operating together as an electromagnetic shield that reduces the amount of electrical noise of the package.

Art Unit: 2826

17. Huang et al. show an electronic device incorporating the IC package of Claim 16.

Therefore, it would have been obvious to one of ordinary skill in the art to use the ground planes and the conductive mounting pegs as "merely a matter of obvious engineering choice" as set forth in the above case law.

Response

Applicant's arguments filed 9/3/04 have been fully considered, but are not understood, since they do not address the outstanding rejections as applied. The rejection remain outstanding as detailed above.

The listed references are cited as of interest to this application, but not applied at this time.

Field of Search	Date
U.S. Class and subclass: 257/712,713,717,720,668,778,737,738,734,691,696,698, 675,676,796,784,786,706,707,734	6/4/04 11/16/04
Other Documentation: foreign patents and literature in 257/712,713,717,720,668,778,737,738,734,691,696,698, 675,676,796,784,786,706,707,734	6/4/04 11/16/04
Electronic data base(s): U.S. Patents EAST	6/4/04 11/16/04

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alexander O Williams whose telephone number is (571) 272 1924. The examiner can normally be reached on M-F 6:30-7:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nathan Flynn can be reached on (571) 272 1915. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 2826

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

AOW
11/16/04



Primary Examiner
Alexander O. Williams